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THE GENUS *ANISEPYRIS* IN AMERICA NORTH OF MEXICO

(HYMENOPTERA, BETHYLIDAE)

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Anisopyris is one of the most distinctive genera of Bethylidae: the pronotal disc is margined on three sides by a carina and the male antennae are apparently only 12-segmented. Some of the species are fairly large (for bethylids) and some of them are brightly colored with metallic blue or green, giving them a superficial resemblance to cleptids and chrysidids. Aside from Kieffer's work (1914, *Das Tierreich*, 41: 434-444), there have been no revisionary studies of this group, and identification of species has been impossible, especially since several of Ashmead's species properly belonging here have been assigned by Kieffer and others to other genera. The present paper is an attempt to remedy this situation.

Anisopyris is a strictly American genus, with its center of distribution in the islands and continental areas surrounding the Caribbean Sea and the Gulf of Mexico. Kieffer recognized three species from the United States, seven from Central America, five from the West Indies, and six from Trinidad and northern South America. In the present paper the number of species known to occur in the United States is increased to twelve, four times the number recognized by Kieffer. The number of neotropical species will, I am sure, eventually be increased by at least as many times. I had hoped to include at least part of the neotropical fauna in this study, but because of the unavailability of Kieffer's types and the ambiguity of his descriptions this has proved impossible.

Material studied.—Specimens of *Anisopyris* are not common in collections, and I have had to borrow material from many different

¹The Grace H. Griswold Fund, Entomology Department, Cornell University, is acknowledged for assuming the expense of two plates.

sources on which to base this study. I have listed in the following paragraph these various sources of material and have indicated the abbreviations used for them in this paper. Arrangement is alphabetical with respect to the abbreviations. I wish to express my thanks to all who have loaned material for use in this study.

American Museum of Natural History, New York (AMNH); Academy of Natural Sciences, Philadelphia (ANSP); California Academy of Sciences, San Francisco (CAS); California Insect Survey, Berkeley (CIS); Carnegie Museum, Pittsburgh (CM); Cornell University, Ithaca (CU); Florida State Plant Board, Gainesville (FPB); Henry K. Townes, Ann Arbor, Mich. (HKT); Illinois Natural History Survey, Urbana (INHS); Kansas State College, Manhattan (KSC); Karl V. Krombein, Arlington, Va. (KVK); Museum of Comparative Zoology, Cambridge, Mass. (MCZ); Oregon State College, Corvallis (OSC); R. R. Dreisbach, Midland, Mich. (RRD); University of Arizona, Tucson (UA); University of California, Davis (UCD); University of Idaho, Moscow (UI); U. S. National Museum, Washington (USNM).

Systematic position.—There can be little doubt that *Anisepyrus* represents a single, rather specialized phyletic line which has arisen from some element in the much more protean, cosmopolitan genus *Rhabdepyrus*. I would expect it to have evolved from that stock which includes, for example, the southwestern U. S. species *megacephalus* Ashmead. In this species the body form is very suggestive of *Anisepyrus*, the male genitalia approach those of that genus, and the third antennal segment of the male is nearly as much reduced. However, the pronotal disc is not margined by a carina. Several other species (so far as I know all undescribed) possess a carina on the anterior margin of the pronotal disc, but not on the sides, and show a still further tendency for the third antennal segment of the male to become reduced and consolidated with the fourth. It is not at all difficult to visualize *Anisepyrus* as having arisen from a *megacephalus*-like stock and to point out certain species which appear to represent stages in this evolution.

These facts make it uncertain as to whether *Anisepyrus* deserves full generic status. It is quite possible that when the generic classification of the Bethyridae has been finally settled, *Anisepyrus* as here understood will constitute no more than a subgenus of *Rhabdepyrus* or some other inclusive genus. However, since *Anisepyrus* is easily recognizable and apparently monophyletic, I see no harm in continuing to recognize it for the present as a full genus.

Ethology.—I have examined over 400 specimens of this genus, but not one of them bears any host data. Other Epyrini attack the larvae of Coleoptera and Lepidoptera (see summary by Yamada, 1955, *Mushi*, 28: 14-16). I would expect *Anisepyrus* to do likewise, but I have no idea precisely what they may attack. Specimens are most often taken close to the ground, especially where the soil is somewhat

sandy; they are often collected by sweeping low grass or other vegetation. More than most other Bethyridae, adults of this genus feed on honeydew, and are probably more often taken on foliage covered with honeydew than anywhere else. There are also several records of them visiting flowers for nectar.

Structure and terminology.—The species of *Aniscopyris* vary in length from 3 to 8 mm. Both sexes are fully winged. The antennae are 13-segmented in both sexes, but in the male the third segment is reduced to a barely visible ring-segment closely consolidated with the fourth (fig. 7), such that the antennae appear 12-segmented. The mandibles have five apical teeth (rarely four). The clypeus has a strong median carina which apically may form a small tooth. The eyes are large and are hairy. Certain measurements of the head have been found useful for separating species. The term *vertical facial line* is used for an imaginary line drawn from the top of the vertex to the bottom of the clypeus, in full frontal view. The term *trans-facial line* is used to denote the greatest width of the head, including the eyes, again in full frontal view. The *middle interocular line* is an imaginary line drawn between the eyes at the narrowest part of the front. Eye height is measured in lateral view. The *ocello-ocular line* is one drawn from the nearest eye margin to a lateral ocellus; the *width of the ocular triangle* includes the two lateral ocelli as well as the space between them.

The pronotum is flat or slightly convex dorsally and bears a strong transverse carina anteriorly as well as a pair of lateral carinae, so that the disc is margined on three sides. In many species there is a groove running parallel to the posterior margin, often more or less punctate or foveolate. The mesoscutum bears a pair of strong notauli which diverge slightly anteriorly and do not quite reach the anterior margin. The scutellum has at its base a strong transverse groove which is slightly expanded on each side. The propodeum has five (fig. 11) or seven (fig. 2) discal carinae, and two carinae on each side, the lateral and sublateral carinae; there is a strong carina separating the disc from the declivity, and the latter has a median carina and numerous transverse rugae. The mesopleuron has numerous large and small foveae. At the extreme top is an elongate submarginal fovea; below this is a series of two foveae, often connected, which I call the *upper mesopleural foveae*; below this is another large fovea (fig. 13) or series of two foveae (fig. 8) which I call the *lower mesopleural foveae*. The wing venation is like that of other Epyrini and appears to show no diagnostic characters on either the generic or the species level.

The last sternite of the male, or subgenital plate, is subtriangular and truncate or emarginate apically (figs. 5, 16). The genitalia are characteristic of the genus and show only minor differences between the species (fig. 3). The aedeagus is slender and of simple structure. The parameres form large lateral lobes bearing numerous setae and having a somewhat reticulate surface (fig. 4). The structures between the aedeagus and the parameres constitute the somewhat complex

volsellae. The more median appendage is the digitus, a somewhat shoe-shaped structure with a series of small apical serrations. The lateral appendage is the cuspis, which is divided apically into dorsal and ventral arms, both of which bear a few small setae.

Nomenclature.—The genus *Anisepyrus* was described by Kieffer in 1905 (*In André, Spec. Hymen. Eur. Alg.*, v. 9, p. 248), although both Neave's Nomenclator and that of the Prussian Academy (as well as Kieffer himself) date the genus from 1906 (*Ann. Soc. Sci. Bruxelles*, 30: 137). Muesebeck and Walkley (1951, U. S. Dept. Agri. Monogr. no. 2, p. 730) correctly date the genus and also point out that the type species is *Epyrus amazonicus* Westwood, the only described species mentioned by Kieffer in his original description. Kieffer designated *A. acncus* Kieffer as type, but this was a *nomen nudum* until a year later. I have seen no specimens of *amazonicus*, but have no reason to doubt that it is congeneric with the species here treated under the name *Anisepyrus*.

KEY TO SPECIES

Females

1. Pronotal disc with numerous longitudinal carinae; teeth of mandibles irregular, the basal one very small, fig. 28; clypeus yellowish, with a narrow black apical border; pronotum and mesonotum contrasting in color, the former greenish, the latter bluish 12. **rugosicollis** Brues
Pronotal disc without longitudinal carinae, except one on each side; teeth of mandibles more regular; clypeus black; pronotum and mesonotum not contrastingly colored 2
2. Mandibles with four teeth, the upper tooth broad and blade-like, fig. 27; mandibles with a strong ridge on the outer side; head and thorax bluish or greenish, the abdomen rufous at least apically 11. **analis** (Cresson)
Mandibles with five similar teeth in an oblique series and without a ridge on the outer side, figs. 22, 23, 26; color variable, rarely as above 3
3. Anterior part of front rectangularly produced so that the ridge above the antennal orbits is far below the bottoms of the eyes, the antennal scrobes nearly vertical and not margined above by a carina, fig. 21; lateral carinae of pronotal disc weak 10. **dietrichorum**, new species
Anterior part of front not rectangularly produced, the ridge above the orbits closer to the bottoms of the eyes, the scrobes more oblique and margined above by a carina, figs. 1, 12, 20; lateral carinae of pronotal disc strong 4
4. Middle tibiae very weakly spinose, fig. 6; lower mesopleural fovea divided in two or at least strongly constricted in the middle, figs. 8, 9; propodeum with seven discal carinae, fig. 2 (**columbianus** group) 5
Middle tibiae spinose above for most of their length, fig. 14; lower mesopleural fovea entire, its upper margin often weakly defined, fig. 13; propodeum usually with five discal carinae, occasionally with seven (**occidentalis** group) 8

- 5. Head and thorax black or weakly aeneous or violaceous; middle interocular line usually considerably exceeding the eye height 6
- Head and thorax strongly aeneous or bluish, the propodeum and gaster contrastingly black with deep blue reflections; middle interocular line barely exceeding the eye height 7
- 6. Lower mesopleural fovea almost always completely divided by a vertical ridge, fig. 8; punctures of front separated from one another by from 1 to 3 times their own diameters; legs wholly ferruginous 1. **columbianus** (Ashmead)
- Lower mesopleural fovea constricted in the middle, but rarely divided except occasionally by a very narrow line, fig. 9; front generally more closely punctate, the punctures separated from one another by from 0.5 to 2 times their own diameters; basal parts of legs dark brown (except legs wholly ferruginous in specimens from Arizona and southern California) 2. **williamsi**, new species
- 7. Head and thorax aeneous or bluish-green; front shining, weakly to moderately alutaceous; size smaller, 4.0-5.2 mm. 3. **aeneiceps** (Ashmead)
- Head and thorax dark blue, without any greenish reflections; front very weakly shining, strongly alutaceous; size larger, about 6 mm. 4. **grandis** (Ashmead)
- 8. Pronotum with a well-defined punctate groove paralleling the posterior margin; species of western distribution, east to Idaho and Arizona 9
- Pronotum without a groove paralleling the posterior margin, or such a groove weakly developed on the sides and absent medially; chiefly eastern and midwestern species, west to Colorado and British Columbia 11
- 9. Front narrow and eyes relatively large, the middle interocular line subequal to the eye height, fig. 18; vertex but little produced above the tops of the eyes; propodeum with seven discal carinae, but with the sublateral carinae obsolescent, fig. 19 7. **laticeps**, new species
- Front broader, the middle interocular line at least 1.25 times the eye height, figs. 12, 15; vertex extending well above the tops of the eyes; propodeum with five discal carinae (rarely with seven, but the additional two weak) the sublateral carinae strong, fig. 11 10
- 10. Vertex broad, more or less squared off, the occipital carina weak and not or barely visible in anterior view, figs. 10, 12; ocello-ocular line considerably greater than the width of the ocellar triangle 5. **occidentalis** (Ashmead)
- Vertex narrow and more rounded, the occipital carina strong, visible in anterior view at the top of the vertex, fig. 15; ocello-ocular line barely if at all exceeding the width of the ocellar triangle 6. **arizonicus**, new species
- 11. Upper part of front, in profile, relatively flat, the lower part strongly swollen, fig. 23; mandibles unusually broad, the basal four teeth very broad and blunt, figs. 23, 26; head and thorax dark blue 9. **gibbosifrons**, new species
- Front, in profile, rather evenly rounded, fig. 22; mandibles not unusually broad; color black, the head and thorax sometimes more or less bluish 8. **subviolaceus** Kieffer

Males

(Males of *acniciceps*, *analis*, *arizonicus*, *diétrichorum*, and *rugosicollis* are unknown.)

1. Ocellar triangle relatively small, the ocello-ocular line exceeding the width of the ocellar triangle; lower mesopleural fovea divided in two by a vertical ridge; base of digitus of genitalia with only about two small setae, fig. 3 (*columbianus* group) 2
- Ocellar triangle larger, the ocello-ocular line equal to or shorter than the width of the ocellar triangle; lower mesopleural fovea undivided, often incomplete or obsolescent; base of digitus with numerous large setae, figs. 17, 24, 25 (*occidentalis* group) 4
2. Head and thorax with a rather strong dark bluish cast; legs mostly bright ferruginous 4. *grandis* (Ashmead)
- Head and thorax black, with at most obscure bluish reflections; legs black, the tarsi and sometimes the tibiae brownish 3
3. Punctures of front generally obscured by the strong microscopic sculpturing; pronotal disc strongly alutaceous, rather dull; lower mesopleural fovea generally divided by a flat-topped ridge ... 1. *columbianus* (Ashmead)
- Punctures of front small but clearly evident; pronotal disc weakly alutaceous, shining; lower mesopleural fovea generally divided by a narrow carina 2. *williamsi*, new species
4. Pronotum without a punctate groove paralleling the posterior margin, except on the extreme sides; head with a strong bluish cast 9. *gibbosifrons*, new species
- Pronotum with a punctate groove paralleling the posterior margin (occasionally somewhat weakened medially); head with at most a very weak bluish cast 5
5. Front strongly alutaceous, strongly and closely punctate, the punctures separated by no more than their own diameters; head very broad, the transfacial line 1.15 times the vertical facial line ... 7. *laticeps*, new species
- Front weakly to moderately alutaceous, the punctures separated by more than their own diameters (occasionally obsolescent); transfacial line from 1.05 to 1.15 times the vertical facial line 6
6. Wings pale, the veins light yellowish-brown, the setulae on the membrane light brown to nearly white; antennal flagellum yellowish ventrally and apically, sometimes almost wholly yellowish; front weakly to strongly shining, noticeably alutaceous 8. *subviolaceus* Kieffer
- Wings darker, the veins brown, setulae on the wing membrane brown; antennae black, the terminal segments often suffused with brown; front strongly shining, weakly alutaceous, the punctures strong (rarely nearly absent) 5. *occidentalis* (Ashmead)

COLUMBIANUS SPECIES-GROUP

This group contains four species which are exceedingly similar in form, even to having virtually identical male genitalia in which the setae at the base of the digitus are small and only about two in number. In the female the middle tibiae are weakly spinose and the propodeal disc has seven carinae. The lower mesopleural fovea is

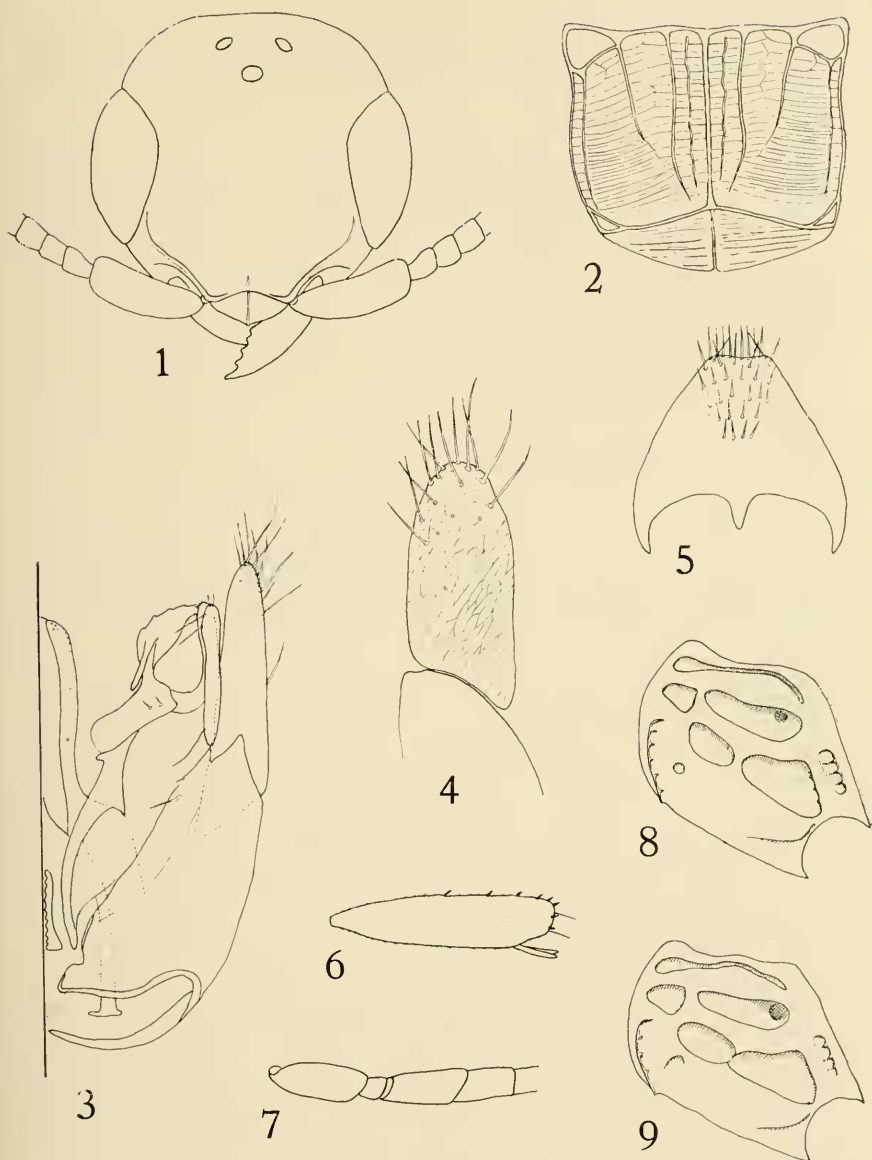


Fig. 1, *Anisopyris columbianus* (Ashmead), anterior aspect of head of female. Fig. 2, same, dorsal view of propodeum of female. Fig. 3, same, ventral aspect of left half of male genitalia. Fig. 4, same, lateral view of paramere of male. Fig. 5, same, ventral aspect of subgenital plate of male. Fig. 6, same, middle tibia of female. Fig. 7, same, basal five segments of antenna of male. Fig. 8, same, lateral view of mesopleuron of female. Fig. 9, *A. williamsi*, new species, lateral view of mesopleuron of female.

divided in two or nearly so. The ocellar triangle is small, with the ocello-ocular line exceeding the width of the ocellar triangle in both sexes.

1. *Anisepyrus columbianus* (Ashmead)

(Figs. 1-8)

Epyris columbianus Ashmead, 1893, Bull. U. S. Nat. Mus., 45:58, 60-61. [Type: ♀, Washington, D. C., USNM no. 14065.] —Brues, 1907, Bull. Wis. Nat. Hist. Soc., 5:98.

Rhabdepyris (Trichotepyrus) columbianus Kieffer, 1908, Genera Insectorum, 76:31.

Rhabdepyris (Rhabdepyris) columbianus Kieffer, 1914, Das Tierreich, 41:348, 357.

Anisepyrus pulchellus Fouts, 1928, Proc. Ent. Soc. Wash., 30:126. [Type: ♀, Glen

Echo, Md., Aug. 1, 1921 (R. M. Fouts), coll. R. M. Fouts.] New synonymy.

—Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 730.

Rhabdepyris columbianus Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 729.

Anisepyrus columbianus Krombein, 1958, Proc. Ent. Soc. Wash., 60:50.

This appears to be the commonest *Anisepyrus* east of the Great Plains. It has been taken in Berlese samples, at light, sweeping grasslands, on honeydew, and on the flowers of *Asclepias* and *Amelanchier*. In the South it appears to occur throughout the year; in the North most records are from the late summer months.

Female.—Length 4.6 mm.; fore wing 2.5-3.3 mm. Color black, head and parts of thorax sometimes faintly aeneous; mandibles dark ferruginous; antennae ferruginous, slightly infuscated apically; legs, including coxae, bright ferruginous. Wings nearly hyaline, with a faint, diffuse brownish cloud in outer part of submedian cell and a larger, more distinct brownish cloud around and below radial vein. Mandibles with five simple teeth in an oblique series. Head subcircular in anterior view, transfacial and vertical facial lines subequal, fig. 1. Clypeal carina, in profile, weakly arched. Front moderately shining, distinctly alutaceous, punctures small but well-defined, separated from one another by from 1 to 3 times their own diameters. Middle interocular line .57 to .63 times transfacial line, 1.0 to 1.25 times eye height; ocello-ocular line from 1.2 to 1.4 times width of ocellar triangle; carina above antennal scrobes strong, reaching nearly to the eyes. Pronotal disc moderately shining, alutaceous, sparsely punctate; anterior and lateral carinae strong; subapical foveolate groove well-defined, complete. Mesonotum sparsely punctate. Propodeum with seven discal carinae and transversely striolate as shown in figure 2. Mesopleuron with the lower fovea divided in two by a vertical ridge which is often wide, sometimes very narrow, rarely incomplete, fig. 8. Middle tibiae with subapressed hairs among which are a few small spines, mostly toward the apex, fig. 6.

Male.—Length 3.5 mm.; fore wing 2.0-2.9 mm. Color black; apex of mandibles ferruginous; antennae varying from pale brown to nearly black; legs black, the tarsi and sometimes the tibiae brown; wings subhyaline. Mandibles with five teeth; clypeal carina strongly arched. Front very weakly shining, strongly alutaceous, the punctures small, shallow, and usually scarcely visible amid the strong

microscopic sculpturing. Basal antennal segments as shown in figure 7. Middle interocular line .63 to .67 times transfacial line, 1.3 to 1.42 times eye height; ocello-ocular line 1.05 to 1.20 times width of ocellar triangle; carina above antennal scrobes strong. Pro- and mesonota weakly shining, moderately alutaceous, weakly punctate; pronotal disc with margining carinae and posterior groove very strong. Propodeal disc about as in female, but the two carinae close beside the median carina often weak, so that there are only five well-defined discal carinae. Mesopleura about as in female. Subgenital plate, fig. 5, truncate or very weakly concave apically. Genitalia, figs. 3, 4, with only two small setae at the base of the digitus and with the two arms of the cuspis both linear or nearly so.

Distribution.—This species ranges from Florida and central Texas north to Kansas, Illinois, New York, and Massachusetts. I have examined 102 specimens from the following localities: MASSACHUSETTS: 1 ♂, Woods Hole (K. Cooper) [USNM]; NEW YORK: 1 ♀, 1 ♂, Ithaca, July, Sept. (H. Evans) [CU]; 1 ♂, Granby Center, July (H. Evans) [CU]; 1 ♀, Central Park, L. I. (G. Engelhardt) [MCZ]; 1 ♂, Cold Spring Harbor, L. I., July [AMNH]; NEW JERSEY: 1 ♂, Princeton, Oct. (K. Cooper) [USNM]; PENNSYLVANIA: 1 ♀, Philadelphia (C. F. Baker) [USNM]; 1 ♀, Edge Hill, May [ANSP]; 1 ♀, Hanover, June (Bridwell & Barber) [USNM]; 2 ♂ ♂, Ohio, Pyle, Aug. [CM]; MARYLAND: 4 ♀ ♀, 2 ♂ ♂, Cabin John, Glen Echo, Takoma Park, Piney Pt., June-Oct. [USNM, HKT, coll. R. M. Fouts]; DISTRICT OF COLUMBIA: 1 ♀, Washington [USNM]; VIRGINIA: 18 ♀ ♀, 4 ♂ ♂, Barcroft, Falls Church, Arlington, Glencaryn, Clifton, Vienna, Dunn Loring, Apr.-Sept. [USNM, MCZ, AMNH, HKT]; WEST VIRGINIA: 1 ♂, Lost River State Park, Hardy Co., Aug. (K. Krombein) [KVK]; NORTH CAROLINA: 1 ♀, Elizabethtown, Apr. (H. & M. Townes) [HKT]; 1 ♀, Hamrick, Aug. (H. & M. Townes) [HKT]; 3 ♀ ♀, Wallace, June (H. Townes) [HKT]; SOUTH CAROLINA: 1 ♀, 3 ♂ ♂, Columbia, Aug.-Sept. (L. & G. Townes) [HKT]; 1 ♀, Florence, Feb. (C. Rainwater) [USNM]; 1 ♀, 4 ♂ ♂, Greenville, Aug.-Sept. (L. & G. Townes) [HKT]; 2 ♂ ♂, Table Rock, Aug. (G. & L. Townes) [HKT]; GEORGIA: 1 ♀, Zebulon, Apr. (P. Fattig) [USNM]; 1 ♂, LaGrange, Aug. [AMNH]; FLORIDA: 1 ♂, Jacksonville [USNM]; 1 ♀, Edgewater, Feb. (C. Frost) [MCZ]; 1 ♀, Marion Co., March (H. Weems) [FPB]; ALABAMA: 2 ♀ ♀, Auburn (C. F. Baker) [USNM]; TENNESSEE: 1 ♂, Gatlinburg, July (R. Whittaker) [USNM]; OHIO: 1 ♀, Shaker Heights, Aug. (E. McDonald) [USNM]; ILLINOIS: 11 ♀ ♀, 2 ♂ ♂, Urbana, Jan-Dec. [INHS, AMNH]; 1 ♀, Thebes, Apr. (Ross & Sanderson) [INHS]; 1 ♂, Evergreen Park, Aug. (Ross & DeLong) [INHS]; 1 ♂, Elizabethtown, July (Ross & DeLong) [INHS]; 1 ♀, Plainview, June [INHS]; MISSOURI: 1 ♂, Springfield, Sept. (R. Crandall) [UA]; KANSAS: 3 ♂ ♂, Riley Co., July-Aug. [KSC, USNM]; 1 ♀, Lawrence, June [CM]; LOUISIANA: 1 ♀, Tallulah [USNM]; TEXAS: 1 ♀, no further data [ANSP]; 1 ♀, Kerrville, June (F. Pratt) [USNM]; 1 ♂, College Station [USNM]; 1 ♂, Brownwood, July

[USNM]; 1 ♂, Mercedes, Feb. [USNM]; 1 ♀, Denton Co., Dec. [IHIS]; 1 ♂, S. F. Austin St. Pk., near Sealy, May (H. Evans) [CU]; 4 ♂♂, 5 mi. N. of Sinton, May (H. Evans) [CU].

2. *Anisepyris williamsi*, new species

(Fig. 9)

This species inhabits the Pacific coastal states, east to Utah and Arizona. It is very similar to *columbianus* and may represent only a western race of that species; however, on the basis of present data there seems to be a wide gap between the ranges of the two species. As in *columbianus*, there is a tendency for specimens from southern parts of the range to be somewhat more brightly colored and to have the front narrower in relation to the eye height.

Female.—Length 4-5.5 mm.; fore wing 2.6-3.2 mm. Color black, head and parts of thorax frequently faintly aeneous or violaceous; mandibles dark ferruginous; antennae brownish, somewhat ferruginous beneath; legs dark brown, tarsi and sometimes the tibiae light yellowish-brown (in specimens from Arizona and southern California the legs and antennae are mostly bright ferruginous). Wings subhyaline, with weak, diffuse infuscated areas in outer part of submedian cell and around and below radial vein. Mandibles with five simple teeth in an oblique series. Front weakly to moderately shining, distinctly alutaceous, punctures of moderate size, separated from one another by from 0.5 to 2 times their own diameters. Middle interocular line .59 to .65 times transfacial line, 1.1 to 1.35 times eye height; ocello-ocular line 1.0 to 1.25 times width of ocellar triangle. Carina above antennal scrobes strong, reaching at least halfway to eyes. Pronotal disc moderately shining, sparsely punctate; anterior and lateral carinae strong; subapical marginal punctate groove well-defined. Mesoscutum weakly punctate; propodeum as described and figured for *columbianus*. Mesopleuron with lower fovea typically constricted sharply in the middle, fig. 9, in one specimen actually divided in two. Middle tibiae weakly spinose.

Male.—Length 3.5 mm.; fore wing 2-3 mm. Color black; apex of mandibles dark ferruginous; antennae dark brown to black; legs black except tarsi and sometimes tibiae brownish; wings nearly hyaline. Mandibles 5-toothed; clypeal carina strongly arched. Third antennal segment minute, barely visible; fourth segment 1.6 times as long as its greatest thickness. Front moderately shining, alutaceous, punctures weak, shallow, separated by 1 to 2 times their own diameters. Middle interocular line .63 to .66 times transfacial line, 1.3 to 1.5 times eye height; ocello-ocular line from 1 to 1.15 times width of ocellar triangle; carina above antennal scrobes strong, reaching nearly to eyes. Pro- and mesonota shining, weakly punctate; pronotum with margining carinae and posterior submarginal groove strong. Propodeum with five or seven discal carinae, the carinae close beside the median carina varying from weak to quite strong. Mesopleuron with the lower fovea divided (or nearly so) by a narrow (rarely a broad) vertical ridge. Subgenital plate and genitalia as described for *columbianus*.

Types.—Holotype ♀, Danville, Contra Costa Co., Calif., July 12, 1949 (F. X. Williams); allotype ♂, same data but Aug. 2, 1949 [both

CAS]. The remaining specimens listed below are to be regarded as paratypes.

Distribution.—Arizona and southern California north to Oregon, Idaho, and Utah. I have examined 40 specimens from the following localities: CALIFORNIA: 3 ♀♀, 2 ♂♂, Danville, July-Aug. (Williams) [CAS, USNM]; 1 ♂, Mt. Diablo, Aug. (Williams) [CAS]; 2 ♀♀, Woodland, Aug. (A. McClay) [UCD]; 1 ♀, Strawberry, Tuolumne Co., June (J. Rozen) [CIS]; 1 ♀, Tuolumne City, June (Rozen) [CIS]; 1 ♀, Lemon Cove, Tulare Co., July [CU]; 1 ♀, 1 ♂, San Diego, Aug. (H. & M. Evans) [CU]; 1 ♀, Carmel, May (E. VanDyke) [CAS]; 1 ♀, San Jose, June [CAS]; 1 ♀, San Mateo Co., June (W. Giffard) [CAS]; 1 ♀, Redwood Canyon, Marin Co., May (VanDyke) [CAS]; 1 ♀, N. Sacramento, Nov. (stinging Mrs. A. P. Messenger) [USNM]; 1 ♂, Lindsay, March, on *Asclepias* (W. Davidson) [USNM]; 1 ♀, Stanford Univ., Feb., on pepper tree (F. Sumner) [CAS]; 1 ♂, Cedar Pass, Modoc Co., Oct. (E. Schlinger) [UCD]; 1 ♂, Niles Canyon, July (W. Giffard) [CAS]; 1 ♂, Clayton, Shasta Co., July (E. VanDuzee) [CAS]; 1 ♂, no further data [paratype of *occidentalis* Ashmead, USNM]; OREGON: 4 ♀♀, 3 ♂♂, Corvallis, July-Oct. [USNM, OSC]; 2 ♀♀, 2 ♂♂, Woodburn, Aug., on wild carrot (R. Rieder) [OSC]; 1 ♂, Cornelius, Aug. (Schuh & Gray) [OSC]; IDAHO: 2 ♂♂, 12 mi. NW Regina, Ada Co., July, on *Helianthus* (W. Barr) [UI]; UTAH: 1 ♂, Fernow Valley, Juab Co., June (R. Fantin) [CAS]; ARIZONA: 1 ♀, 30 mi. E. of Quijotoa, Pima Co., Aug. (J. Bradley) [CU].

3. *Anisepyrus aeneiceps* (Ashmead), new combination

Epyris aeneiceps Ashmead, 1893, Bull. U. S. Nat. Mus., 45:58, 59. [Type: ♀, Fort Capron, Florida, Nov. 4 (E. A. Schwarz) USNM no. 14064.] —Brues, 1907, Bull. Wise. Nat. Hist. Soc., 5:98.

Rhabdepyris (Trichotepyrus) aeneiceps Kieffer, 1908, Genera Insectorum, 76:31.

Rhabdepyris (Rhabdepyris) aeneiceps Kieffer, 1914, Das Tierreich, 41:347, 356.

Rhabdepyris aeneiceps Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 729.

This species is also very similar to *columbianus* and may possibly represent a South Florida race of that species. However, the difference in color is striking, and I have seen no intermediates. I have seen only three specimens, all females.

Female.—Length 4.5-2 mm.; fore wing 2.5-3 mm. Color black, the head and thorax with strong metallic reflections which vary from aeneous to greenish-blue, contrasting to the color of the propodeum and gaster, which is shining black with faint bluish reflections; mandibles, antennae, and legs wholly bright ferruginous; anterior, depressed portion of pronotum dark ferruginous; tegulae testaceous. Wings subhyaline, with brownish clouding about as in *columbianus* but more intense. Mandibles with five simple teeth in an oblique series. Clypeal carina in profile nearly straight; carina above the antennal scrobes weak, reaching about

halfway to the eye margins. Front shining, moderately alutaceous, punctures separated from one another by from 1.5 to 2 times their own diameters. Middle interocular line .56 to .59 times transfacial line, 1.0 to 1.1 times eye height; oello-ocular line 1.1 to 1.3 times width of ocellar triangle. Pronotal disc weakly punctate, margining carinae fairly strong, but groove paralleling the posterior margin rather weak, shallow. Mesoscutum alutaceous, weakly punctate. Propodeum as described and figured for *columbianus*, fig. 2, the transverse striations on the posterior part of the disc a little weaker. Lower mesopleural fovea divided in two by a vertical ridge which may be narrow or fairly broad.

Male.—Unknown.

Distribution.—Southern Florida. I have examined three specimens, as follows: FLORIDA: 1 ♀, Fort Capron, Nov. (E. A. Schwarz) [type, USNM]; 1 ♀ So. Miami, Oct. (S. Graenicher) [MCZ]; 1 ♀, Pinellas Co., Feb. 22, 1930 (B. Moora) [USNM].

4. *Anisepyrus grandis* (Ashmead), new combination

Goniozus grandis Ashmead, 1887, Ent. Amer., 3:76. [Type: ♀, Jacksonville, Fla. USNM no. 14066.]

Epyrus grandis Ashmead, 1893, Bull. U. S. Nat. Mus., 45:58, 61. —Brues, 1907, Bull. Wis. Nat. Hist. Soc., 5:98.

Rhabdepyris (*Trichotepyrus*) *grandis* Kieffer, 1908, Genera Insectorum, 76:31.

Rhabdepyris (*Rhabdepyris*) *grandis* Kieffer, 1914, Das Tierreich, 14:347, 355.

Rhabdepyris grandis Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 729.

This species is known only from the type and from a single male assigned here tentatively. With so little material available, it is difficult to be certain that it represents a distinct species from *acneiceps* or *columbianus*, but my present feeling is that it does. Ashmead's male allotype, which he described at length in 1893, is an *Epyrus*. The venational character with Ashmead mentions is not present in his type female.

Female.—Length 6 mm.; wings incomplete. Color black, head and thorax with strong bluish reflections, propodeum and gaster shining black, with faint blue reflections; mandibles, antennae, and legs wholly bright ferruginous; tegulae testaceous. Mandibles with five simple teeth in an oblique series. Carina above the antennal scobes rather strong, but reaching only about halfway to eye margins. Front weakly shining, strongly alutaceous; punctures large, in the center of the front removed from one another by from 1 to 1.5 times their own diameters. Middle interocular line .58 times the transfacial line, 1.12 times the eye height; oello-ocular line 1.25 times width of ocellar triangle. Pronotal disc moderately shining, weakly punctate; margining carinae fairly strong, groove paralleling the posterior margin only weakly foveolate. Mesonotum weakly punctate. Propodeal disc essentially as described and figured for *columbianus*, fig. 2. Lower mesopleural fovea divided in two by a broad, vertical ridge.

Male.—Length 4.3 mm.; fore wing 2.6 mm. Color black, head and thoracic dorsum with strong, deep blue reflections; apex of mandibles and tip of abdomen dark ferruginous; antennae dark brown, lighter toward apex; legs bright ferruginous,

coxae and middle and hind femora tinged with fuscous; wings subhyaline. Mandibles with five teeth; clypeal carina strongly arched; carina margining the antennal scrobes strong, reaching more than halfway to eye margins. Front weakly shining, strongly alutaceous, punctures shallow and barely evident amid the microscopic sculpturing, 1-2 times their own diameters apart. Middle interocular line .65 times transfacial line, 1.3 times eye height; ocello-ocular line 1.15 times width of ocellar triangle. Pro- and mesonota moderately shining, strongly alutaceous, the punctures shallow and inconspicuous. Propodeum with seven discal carinae; lower mesopleural fovea divided in two by a broad ridge. Subgenital plate and genitalia not differing noticeably from those of *columbianus*, figs. 3, 4, 5.

Distribution.—Known only from northeastern Florida. I have seen two specimens as follows: FLORIDA: 1 ♀, Jacksonville [type, USNM]; 1 ♂, Welaka, May 1-4, 1955 (H. E. & M. A. Evans, on thistle honeydew) [CU].

OCCIDENTALIS SPECIES-GROUP

This group contains five species which are closely related although slightly more diverse structurally than are members of the preceding group. In the female the middle tibiae are strongly spinose and the propodeum usually has only five discal carinae. The male genitalia have a group of 7 or 8 strong setae at the base of the digitus. In both sexes the lower mesopleural fovea is undivided and its upper margin often somewhat ill-defined. The ocellar triangle is fairly large, and in the male the ocello-ocular line measures shorter than the width of the ocellar triangle.

5. *Anisepyrus occidentalis* (Ashmead), new combination (Figs. 10-14, 16-17)

Epyris occidentalis Ashmead, 1893, Bull. U. S. Nat. Mus., 45:58, 59 [type: ♀, Poway, Calif., USNM no. 14062.]² —Brues, 1907, Bull. Wise. Nat. Hist. Soc., 5:98.

Anisepyrus punctaticeps Kieffer, 1906, Ann. Soc. Sci. Bruxelles, 30:139. [Type: ♂, "Ormsby, Nev." (location unknown); paratype ♂, Ormsby Co., Nev., July (C. F. Baker), CU no. 369.] New synonymy. —Kieffer, 1914, Das Tierreich, 41:434, 436. —Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 730.

Rhabdepyris (Trichotepyrus) occidentalis Kieffer, 1908, Genera Insectorum, 76:32.
Rhabdepyris (Rhabdepyris) occidentalis Kieffer, 1914, Das Tierreich, 41:347, 356.
Rhabdepyris occidentalis Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 729.

This is apparently a not uncommon species in western United States. Both sexes exhibit a certain amount of variation in the size and proximity of the punctures of the head and thorax. Females from southern California often have the head behind the eyes much enlarged, giving

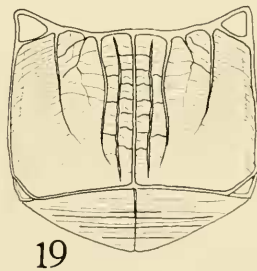
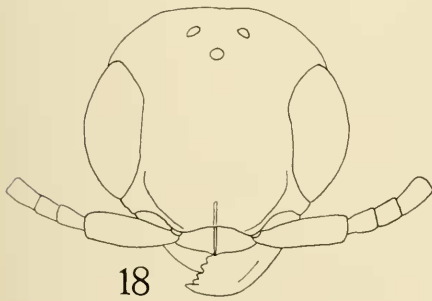
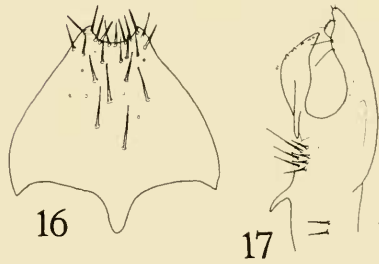
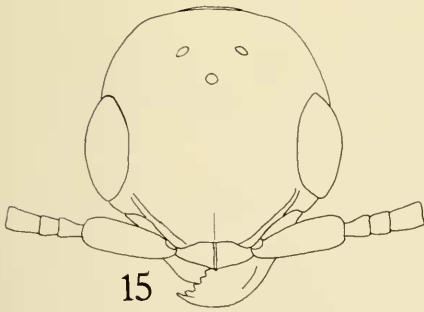
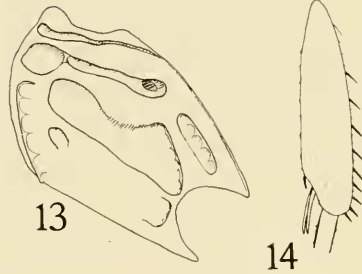
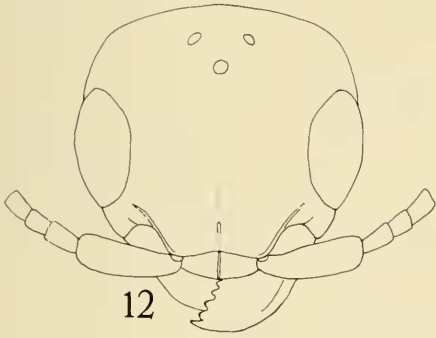
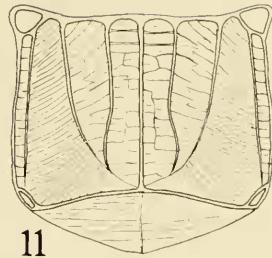
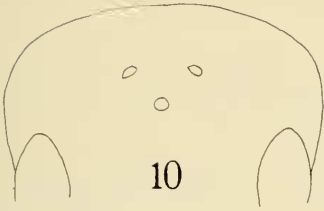
²Ashmead's male allotype is a specimen of *A. williamsi*, new species.

them a very different appearance, fig. 10. I had originally set these females aside as a different species, but it soon became apparent that some specimens are intermediate between this "macrocephalous" condition and the more normal head shape of the species, fig. 12.

Female.—Length 4.0-6.2 mm.; fore wing 2.8-3.6 mm. Color black, head and thorax sometimes obscurely violaceous; mandibles and antennae fusco-ferruginous; coxae and femora black or dark fusco-ferruginous, tibiae light or dark fusco-ferruginous, tarsi yellowish-brown (in Arizona specimens legs entirely bright rufous). Wings hyaline, fore wing slightly clouded along the radial vein; veins brown. Mandibles rather broad, terminating in five strong teeth in an oblique series. Clypeus very short, truncate apically, its median carina short, weakly arched in profile. Front strongly shining, very weakly alutaceous; punctures usually strong, separated from one another by from 2 to 5 times their own diameters. Middle interocular line .61 to .67 times transfacial line, 1.3 to 1.5 times eye height; ocello-ocular line 1.1 to 1.25 times width of ocellar triangle. Vertex extending well above tops of eyes and somewhat squared off, figs. 10, 12; carina above antennal scrobes strong, reaching about two-thirds distance to eye margins. Pronotal disc strongly shining, weakly alutaceous, punctate; margining carinae strong; subapical transverse groove well-defined, complete. Mesoscutum moderately shining, sparsely punctate. Propodeum with five discal carinae and transversely striate as shown in figure 11; in a few individuals an additional pair of weak carinae is present close beside the median carina. Mesopleura with the lower fovea large, its upper margin not sharply defined, fig. 13. Middle tibiae with numerous strong spines over entire upper surface, fig. 14.

Male.—Length 3.5-5.0 mm.; fore wing 2.3-3.1 mm. Color black; palpi light brown; mandibles dark ferruginous apically; antennae black, often somewhat paler toward the apex; legs black except the tarsi, which are light to dark yellowish-brown; tip of abdomen sometimes suffused with reddish-brown; wings hyaline, veins and stigma brown, setulae on membrane brown. Mandibles with five strong teeth; clypeal carina strongly arched. Front strongly shining, weakly alutaceous, strongly punctate (rarely weakly punctate), the punctures separated by from 1.5 to 3 times their own diameters. Middle interocular line from .61 to .68 times transfacial line, 1.33 to 1.62 times eye height; ocello-ocular from .75 to .95 times width of ocellar triangle. Carina above antennal scrobes strong, reaching nearly to eye margins. Pro- and mesonota strongly shining, weakly punctate; groove paralleling the posterior margin of the pronotum very strong. Propodeal disc with five carinae, like that of female but in general less heavily sculptured. Mesopleura as in female. Subgenital plate arcuately emarginate apically, fig. 16. Genitalia similar to those of *columbianus* except for certain features of the vol-

Fig. 10, *Anisepyrus occidentalis* (Ashmead), anterior aspect of upper half of head of a female from Sonoma Co., Calif. Fig. 11, same species, dorsal view of propodeum of female. Fig. 12, same species, anterior aspect of head of a female from Ada Co., Idaho. Fig. 13, same species, lateral view of mesopleuron of female. Fig. 14, same, middle tibia of female. Fig. 15, *A. arizonicus*, new species, anterior aspect of head of female. Fig. 16, *A. occidentalis* (Ashmead), ventral aspect of subgenital plate of male. Fig. 17, same, volsella of male, ventral aspect. Fig. 18, *A. laticeps*, new species, anterior aspect of head of female. Fig. 19, same, dorsal view of propodeum of female.



sellae, fig. 17; the hooklet along the inner margin is more acute, there are seven or eight large setae at the base of the digitus, and the ventral arm of the cuspis is broader and abruptly narrowed subapically.

Distribution.—Arizona and southern California north to Idaho and Washington. I have examined 104 specimens from the following localities: ARIZONA: 2 ♀ ♀, 5 mi. W of Portal, Cochise Co., Mar., Apr. (M. Cazier) [AMNH]; CALIFORNIA: 1 ♀, Poway, San Diego Co. [type, USNM]; 1 ♀, Lindsay, May, on *Asclepias* (W. Davidson) [USNM]; 1 ♀, San Diego (F. Blaisdell) [CAS]; 1 ♀, Gilroy, Sept. (K. Hagen) [CIS]; 2 ♀ ♀, Mesa Grande, Sonoma Co., July (Blaisdell) [CAS]; 1 ♀, San Francisco, April (E. VanDyke) [CAS]; 1 ♀, Big Dalton Dam, Los Angeles Co., June (J. MacSwain) [CIS]; 2 ♀ ♀, without further data [MCZ, ANSP]; NEVADA: 2 ♂ ♂, Ormsby Co., July (C. Baker) [CU]; UTAH: 1 ♀, Garland, July (G. Knowlton) [USNM]; IDAHO: 66 ♀ ♀, 18 ♂ ♂, 12 mi. NW Regina, Ada Co., July, on *Helianthus* (W. Barr) [UI, USNM]; 1 ♀, 9-18 mi. E. Weiser, Washington Co., July, on *Grindelia* (W. Barr) [UI]; 1 ♀, 1 ♂, Shoshone, July (W. Shull) [UI]; OREGON: 1 ♂, Corvallis, July [CU]; WASHINGTON: 1 ♂, Walla Walla, June (G. Bohart) [CIS].

6. *Anisepyris arizonicus*, new species

(Fig. 15)

This species is similar to *occidentalis* in most respects, but the much narrower vertex, with the occipital carina visible at its crest in anterior view, readily distinguish it. It is known from only three specimens, all females.

Female.—Length 5.2-6.2 mm.; fore wing 3.0-3.6 mm. Color black; mandibles ferruginous; antennae pale ferruginous basally, weakly infuscated toward apex; tegulae testaceous; legs bright ferruginous except coxae, which are mostly infuscated. Wings hyaline, veins and stigma light brown. Mandibles with five teeth; clypeal carina strongly arched in profile. Head slightly higher than wide, transfacial distance about .95 times vertical facial distance, fig. 15. Front strongly shining, weakly alutaceous, punctures strong, separated from one another by from 1.5 to 3 times their own diameter. Middle interocular line .63 to .65 times transfacial line, 1.25 to 1.30 times eye height; ocello-ocular line equal to or slightly greater than width of ocellar triangle. Vertex extending well above eye tops, rather narrowly rounded; occipital carina strong, visible at the top of the vertex when the head is viewed from directly in front. Carina above antennal scrobes strong, reaching nearly to eye margins. Pronotal disc about twice as broad as long, moderately shining, with strong punctures; margining carinae strong; punctate groove paralleling the posterior margin distinct for its entire length. Mesoscutum moderately shining, moderately punctate. Propodeal disc with five carina, its sculpturing not differing noticeably from that of *occidentalis*, fig. 11. Mesopleura also as described and figured for *occidentalis*, fig. 13.

Male.—Unknown.

Types.—Holotype ♀, Santa Rita Mts., Ariz., June 16 (E. A. Schwarz); 2 paratype ♀♀, same data but May 20 and 21 [all USNM, type no. 64395].

Distribution.—Known only from the type locality.

7. *Apisepyris laticeps*, new species

(Figs. 18, 19, 24)

This small and rather distinctive species is also known only from southern Arizona, in this case from one female and one male. This sex association is a tentative one, although it seems logical enough on the basis of presently available material. Both sexes possess an unusually broad head and closely punctate front, characters which separate the species readily from *occidentalis* and *arizonicus*.

Female.—Length 4.7 mm.; fore wing 2.7 mm. Color black; thorax with a faint bluish cast; mandibles and antennal flagellum dusky ferruginous; scape and legs beyond coxae bright ferruginous; tegulae testaceous; apical abdominal tergite suffused with brown. Wings hyaline, veins and stigma brown. Mandibles with five sharp teeth in an oblique series. Clypeus broadly truncate apically, its median carina weakly arched in profile. Head slightly wider than high, transfacial line 1.05 times vertical facial line, fig. 18. Front moderately shining, strongly alutaceous, strongly and closely punctate, punctures separated by little more than their own diameters. Middle interocular line .57 times transfacial line, approximately equal to eye height; ocello-ocular line subequal to width of ocellar triangle. Pronotal disc strongly alutaceous, sparsely punctate, with a strong groove paralleling the posterior margin. Mesoscutum and scutellum alutaceous, weakly shining, sparsely punctate. Propodeum with seven discal carinae, the sculpturing otherwise rather weak, the sublateral carinae obsolescent, fig. 19. Mesopleural foveae much as in *occidentalis*, but the upper margin of the lower fovea more distinct. Middle tibiae slightly less strongly spinose than in *occidentalis*.

Male.—Length 3.3 mm.; fore wing 2.6 mm. Color black; apex of mandibles and last abdominal segment suffused with dark ferruginous; flagellum brown; tegulae brown; legs dark brown except the tarsi lighter. Wings hyaline, veins and stigma light brown. Clypeal carina strongly arched; carina margining the antennal scrobes above very strong. Head much broader than high, transfacial line 1.15 times vertical facial line. Front moderately shining, moderately alutaceous, strongly and closely punctate, the punctures separated from one another by approximately their own diameters. Middle interocular line .64 times transfacial line, 1.4 times eye height. Vertex very broad, rather evenly rounded; ocello-ocular line .9 the width of the ocellar triangle. Pronotal disc moderately shining, alutaceous, weakly punctate; margining carinae strong; groove paralleling posterior margin strong and complete. Mesoscutum and scutellum moderately shining, weakly and sparsely punctate. Propodeum with five discal carinae, between which are some irregular rugae; posterior part of disc smooth and shining. Mesopleural foveae as in female. Subgenital plate weakly arcuately emarginate apically. Genitalia very much like those of *occidentalis*, but the dorsal arm of the cuspis somewhat broader, fig. 24.

Types.—Holotype ♀, Southwestern Research Station, 5 mi. W. of Portal, Cochise Co., Arizona, May 14, 1956 (M. Statham) [AMNH]; allotype ♂, Douglas, Arizona, Sept. 18, 1938 (R. H. Crandall) [USNM].

Distribution.—Known only from extreme southeastern Arizona.

8. *Anisepyris subviolaceus* Kieffer

(Figs. 20, 22)

Anisepyris subviolaceus Kieffer, 1910, Ann. Soc. Ent. France, 79:39. [Type: ♀, Denver, Colo. (C. F. Baker) (location unknown).] —Kieffer, 1914, Das Tierreich, 41:435-436. —Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 731.

This species poses a number of problems. First of all, I have not seen the type or any paratypes of *subviolaceus*. However, the species I am treating under that name is the only one I know to occur in Colorado. There is reasonably good agreement with Kieffer's brief description, except for Kieffer's statement "mésomotum et scutellum à reflet faiblement violacé." The usual color of females of this species is glossy black, with weak bluish reflections over the entire body, and this is true of the Colorado specimens I have seen. However, I have seen a few specimens, including two from Nebraska, in which the entire head and thoracic dorsum is quite conspicuously dark blue. Eastern specimens often have the head conspicuously bluish, the thorax less so. I have seen no specimens whatever in which the scutellum and mesoscutum are more evidently violaceous than other parts of the body. The females exhibit not only an unusual amount of variation in color, but also in pronotal shape and density of punctation. The males show much variation in punctation of the front and in the strength of the groove paralleling the posterior margin of the pronotum. It is entirely possible that I am confusing more than one species under the name *subviolaceus*. Only further collecting can solve this problem.

Female.—Length 4.0-5.6 mm.; fore wing 2.5-3.4 mm. Color black, with bluish reflections which are usually faint, but sometimes rather strong on the head and/or thorax; mandibles dark ferruginous; antennae ferruginous, often slightly dusky toward apex; tegulae testaceous; legs bright ferruginous except front coxae fuscous, the other coxae often partially infuscated. Wings hyaline, veins and stigma brown. Mandibles moderately broad, basal four teeth rather broad, fig. 22, but less so than in the following species. Clypeus short, its median carina strongly arched. Carinae margining the antennal scrobes above strong, reaching nearly to eye margins. Front moderately to strongly shining, usually rather weakly alutaceous, punctures strong, separated by from 2 to 3.5 times their own diameters (or sometimes very small and separated by as much as 6 times their diameters). Middle interocular line .66 to .70 times transfacial line, 1.40 to 1.73 times eye height; ocello-ocular line 1.05 to 1.3 times width of ocellar triangle. Front, in profile, evenly convex, fig. 22; vertex, in anterior view, extending well above the eye tops, very broadly rounded, almost rectangular, fig. 20. Pronotal disc convex, moderately to strongly shining; margining carinae well developed, but groove parallel-

ing the posterior margin absent or very nearly so. Mesoscutum with strong, widely spaced punctures. Propodeal disc with five carinae, in general similar to that of *occidentalis*, but with the sculpturing inclined to be somewhat reduced posteriorly. Mesopleura with the upper fovea elongate, often entire, the lower fovea large, undivided, its upper margin poorly defined. Middle tibiae strongly spined above.

Male.—Length 3.3-4.8 mm.; fore wing 2.2-3.1 mm. Color black; palpi brownish; mandibles rufous apically; antennae with the scape blackish, the flagellum brown, grading into light yellowish-brown ventrally and apically, sometimes almost wholly yellowish; legs black, tibiae light to dark brown, tarsi light brown; tip of abdomen sometimes suffused with brownish. Wings hyaline, with a whitish cast, veins and stigma light brown, setulae on the membrane light brown to whitish. Mandi-

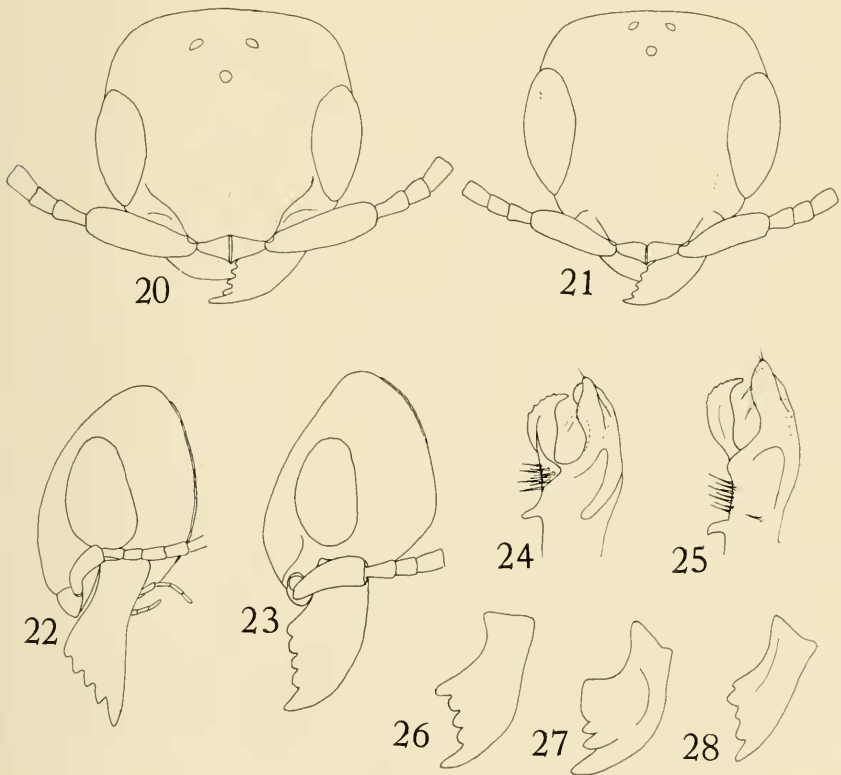


Fig. 20, *Aisepyris subviolaceus* Kieffer, anterior aspect of head of female. Fig. 21, *A. dietrichorum*, new species, anterior aspect of head of female. Fig. 22, *A. subviolaceus* Kieffer, lateral aspect of head of female. Fig. 23, *A. gibbosifrons*, new species, lateral aspect of head of female holotype. Fig. 24, *A. latifrons*, new species, volsella of male, ventral aspect. Fig. 25, *A. gibbosifrons*, new species, volsella of male, ventral aspect. Fig. 26, same species, mandible of female paratype. Fig. 27, *A. analis* (Cresson), mandible of female. Fig. 28, *A. rugosicollis* Brues, mandible of female.

bles with five strong teeth. Apex of clypeus with a median tooth; clypeal carina strongly arched. Front moderately to strongly shining, alutaceous, punctures very variable, sometimes large and distinct, sometimes small or even nearly absent. Middle interocular line .64 to .69 times transfacial line, 1.33 to 1.58 times eye height; ocello ocular line .75 to 1.0 times width of ocellar triangle. Pronotal disc weakly to rather strongly alutaceous; margining carinae strong; punctate groove paralleling the posterior margin usually strong and complete, sometimes weakened or even obsolete medially. Mesonotum moderately alutaceous, weakly punctate; propodeal disc with five carinae; mesopleura as in female. Terminalia not differing markedly from those of *occidentalis*, but subgenital plate only weakly concave apically and hooklet on inner margin of volsella less acute.

Distribution.—This species ranges from Florida, Texas, and New Mexico north to Pennsylvania, Michigan, Wyoming, and British Columbia; it appears to be especially characteristic of the Great Plains, where it is the dominant species of the genus. I have examined 84 specimens from the following localities: FLORIDA: 1 ♀, Jacksonville [USNM]; 1 ♂, Osceola Co., Aug. (J. Kirkland) [USNM]; 20 ♂ ♂, Welaka, April, on thistle honeydew (H. & M. Evans) [CU]; SOUTH CAROLINA: 1 ♀, Columbia, Aug. (L. & G. Townes) [HKT]; PENNSYLVANIA: 1 ♀, Philadelphia (C. Baker) [USNM]; MICHIGAN: 1 ♂, Cheboygan Co., Aug. (R. Dreisbach) [RRD]; 1 ♀, Missaukee Co., July (R. Dreisbach) [RRD]; ILLINOIS: 1 ♂, Algonquin, Aug. [USNM]; 2 ♀ ♀, 1 ♂, St. Anne, July, Aug. [INHS]; NEBRASKA: 1 ♀, Dunning, Aug. (R. Dreisbach) [RRD]; 2 ♀ ♀, Mullens, July (R. Dreisbach) [RRD]; IOWA: 1 ♂, Co. no. 44, July [USNM]; KANSAS: 2 ♀ ♀, 4 ♂ ♂, Manhattan, July-Sept. [KSC]; 2 ♂ ♂, Riley Co., June, Sept. [KSC]; 1 ♂, Dickinson Co., Aug. (J. Bridwell) [USNM]; 1 ♂, Trego Co. [KSC]; TEXAS: 1 ♀, Victoria, July, under dry cowchips (J. Mitchell) [USNM]; 1 ♂, Fedor, Lee Co., June [USNM]; 13 ♂ ♂, 5 mi. N Sinton, May, on thistle honeydew (H. Evans & O. Flint) [CU]; 1 ♂, Inez [IHNS]; 3 ♂ ♂, Brownsville (J. Bridwell) [USNM]; 1 ♂, 6–10 mi. W Ft. Davis, July (H. Evans) [CU]; NEW MEXICO: 1 ♀, Springer (C. Ainslie) [USNM]; COLORADO: 3 ♀ ♀, 2 ♂ ♂, Fort Collins, May-Aug. (C. Baker) [USNM]; WYOMING: 5 ♂ ♂, Powder River, Aug. (Dreisbach & Schwab) [RRD]; IDAHO: 2 ♀ ♀, 6 ♂ ♂, 12 mi. NW Regina, Ada Co., July, on *Helianthus* (W. Barr) [UI, USNM]; BRITISH COLUMBIA: 1 ♂, Vernon, Aug. (H. Leech) [CAS].

9. *Anisepyris gibbosifrons*, new species

(Figs. 23, 25, 26)

This is a very distinctive species and little difficulty should be experienced in its recognition. I would judge it to be the most highly evolved member of the *occidentalis* group.

Female.—Length 5.6 mm.; fore wing 2.9-3.6 mm. Color black; front and pronotum with strong deep blue reflections; mandibles dark ferruginous; antennae and tegulae dusky ferruginous; legs bright ferruginous, coxae somewhat infuscated. Wings subhyaline. Mandibles very large, their apical width three-fourths as great as their maximum length; apical tooth sharp, the other four teeth unusually broad and blunt, fig. 23; in the female paratype the most basal tooth is more prominent than the other three, fig. 26. Clypeus very short, barely visible in full frontal view, its carina strongly arched. Front nearly flat above, very strongly swollen below bottoms of eyes, fig. 23; carinae marginating antennal scrobes above rather strong; vertex produced far above tops of eyes, nearly rectangular, very weakly emarginate medially. Front alutaceous but rather strongly shining, punctures distinct, separated from one another by from 2 to 4 times their own diameters. Middle interocular line .70 to .72 times transfacial line, 1.7 times eye height; ocello-ocular line 1.2 to 1.3 times width of ocellar triangle. Pronotal disc alutaceous, shining, sparsely punctate; marginating carinae fairly strong, but posterior margin without a well-defined subapical groove except on the sides. Mesoseutum slightly more closely punctate than the pronotum. Propodeal disc with five carinae, more or less transversely striate, but the postero-lateral angles smooth and shining. Mesopleura with the lower fovea large, undivided. Middle tibiae strongly spinose.

Male.—Length 4.8 mm.; fore wing 3.1 mm. Color black, the front strongly reflecting dark blue; apex of mandibles ferruginous; antennae suffused with yellowish ventrally, the apical few segments wholly yellowish-brown; tibiae light brown, tarsi yellowish brown; wings subhyaline. Mandibles with five sharp teeth; clypeal carina strongly arched. Front strongly alutaceous, moderately shining, with strong punctures which are separated by 1 to 2 times their own diameters; carinae marginating the scrobes above strong; front with a pair of weak ridges closely paralleling the upper inner orbits. Middle interocular line .64 times transfacial line, 1.26 times eye height; ocello-ocular line .9 the width of the ocellar triangle. Pro- and mesonota weakly shining, strongly alutaceous, fairly closely punctate; pronotal disc with the marginating carinae strong, but the groove paralleling the posterior margin virtually absent. Propodeum and mesopleura about as in female. Subgenital plate very weakly emarginate apically. Genitalia very similar to those of *occidentalis* and *subviolaceus*; volsellae with the basal hooklets rather thick, both dorsal and ventral arms of the cuspis rather stout, fig. 25.

Types.—Holotype ♀, Clementon, N. J., May 24, 1902 (J. C. Bradley) [USNM, type no. 64396]; allotype ♂, Welaka, Fla., Apr. 18-20, 1955, on thistle honeydew (H. & M. Evans) [USNM]; paratype ♀, Sanford, Fla., Apr. 27, 1908 (VanDuzee) [AMNH].

Distribution.—Atlantic coastal plain, Florida to New Jersey.

ANOMALOUS SPECIES

The three species which follow can not be placed in either of the preceding two species-groups, nor are they closely related to one another. All of them are restricted to the extreme southern United States and two of them, at least, have their closest relatives in the neotropics. All three are known from the female sex only.

10. *Anisepyrus dietrichorum*, new species

(Fig. 21)

This species resembles the members of the *occidentalis* group in several respects, but the tibiae are weakly spinose and the propodeum has seven discal carinae. The antennal scrobes are nearly vertical and are ecarinate, a character shared only with *rugosicollis*.

Female.—Length 4.5 mm.; fore wing 2.6 mm. Color black; mandibles dark ferruginous; antennae brownish-ferruginous, yellowish-brown beneath; coxae black, trochanters light brown, femora dark brown, paler apically, tibiae and tarsi light brown; apical abdominal segment suffused with dark ferruginous. Wings subhyaline. Mandibles with five simple teeth; clypeal carina strongly arched. Front strongly alutaceous, rather weakly shining; punctures weak, separated from one another by 1 to 2 times their own diameters. Anterior part of front somewhat rectangularly produced, so that the antennae arise far below the level of the bottoms of the eyes; antennal scrobes nearly vertical, not margined by a distinct carina, fig. 21. Middle interocular line .62 times transfacial line, 1.2 times eye height; ocello-ocular 1.2 times width of ocellar triangle; head rather narrow, vertical facial line 1.1 times transfacial line. Pronotal disc alutaceous, weakly shining, weakly punctate; anterior transverse carina strong, but lateral carinae very delicate; groove paralleling the posterior margin moderately strong but without a series of close-set punctures. Mesoseutum alutaceous, very weakly punctate, notauli strongly diverging in front; groove at base of scutellum narrow, abruptly expanded at each end. Propodeum with seven discal carinae, transversely striate between the carinae, not dissimilar to *columbianus*. Upper mesopleural fovea divided into a small anterior and a more elongate posterior fovea; lower fovea undivided, not sharply defined. Middle tibiae with a few short, weak spines above.

Male.—Unknown.

Type.—Holotype ♀, Arivaca, Pima Co., Arizona, June 2, 1953 (Alice & Henry Dietrich) [USNM, type no. 64387].

Distribution.—Known only from the type.

11. *Anisepyrus analis* (Cresson), new combination

Epyrus analis Cresson, 1872, Trans. Amer. Ent. Soc., 4:193-194. [Type: ♀, Texas (G. Belfrage), USNM no. 1662.] —Ashmead, 1893, Bull. U. S. Nat. Mus., 45:60. —Brues, 1907, Bull. Wisc. Nat. Hist. Soc., 5:98.

Rhabdepyrus (Trichotepyrus) analis Kieffer, 1908, Genera Insectorum, 76:31.

Rhabdepyrus (Rhabdepyrus) analis Kieffer, 1914, Das Tierreich, 41:356.

Rhabdepyrus analis Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 729.

This remarkable species can scarcely be confused with any other. The mandibles are unlike those of any other Nearctic species, but like those of certain West Indian species such as *planiceps* (Fabricius). Probably *analis* is a derivative of this or a related West Indian species and entered our fauna through Florida. Florida specimens differ markedly in color from specimens from other parts of the range: the head and thorax are a much more brilliant green and the gaster is

wholly rufous. However, Georgia and South Carolina specimens are somewhat intermediate, so it does not seem wise to recognize a separate subspecies for the Florida population.

Female.—Length 5.5-7.5 mm.; fore wing 3.4-4.6 mm. Head and thorax bluish green to bright metallic green; propodeum black; gaster black, apical segments bright ferruginous, or abdomen (in Florida specimens) wholly ferruginous; palpi light brown; mandibles and antennae ferruginous; tegulae testaceous; legs ferruginous except front coxae blackish, the other coxae weakly infuscated. Fore wings tinged with brown on the basal .4 and also with a large brown cloud in the vicinity of the radial vein, the area between (below the stigma) paler, the apical .2 of the wing also paler; hind wing hyaline basally, weakly clouded apically. Mandibles very broad apically, strongly curved and with a distinct ridge on outer side, apex with only four teeth, basal tooth broad and blade-like, fig. 27. Clypeal carina strongly arched. Front with a distinct median impression just above the antennal bases; carinae margining the antennal scrobes above strong, reaching nearly to the eye margins and then turning upward parallel to the margins before fading out. Front shining, alutaceous, with strong punctures which are separated from one another by from 1 to 2 times their own diameters. Middle interocular line .61 to .65 times transfacial line, 1.05 to 1.23 times eye height; ocello-ocular line 1.5 to 1.8 times width of ocellar triangle. Pronotal disc moderately shining, alutaceous, punctate; margining carinae strong; groove paralleling posterior margin strong, complete. Mesoscutum and scutellum weakly punctate. Propodeal disc with seven carinae, strongly transversely striate between the carinae. Upper mesopleural fovea divided into a small anterior pit and a larger subtriangular posterior fovea; lower fovea complete, somewhat ill-defined. Middle tibiae not spinose.

Male.—Unknown.

Distribution.—Florida and Texas north to Tennessee and North Carolina. I have seen 10 specimens from the following localities: FLORIDA: 1 ♀, Crescent City, March (H. Hubbard) [USNM]; 1 ♀, Welaka, June (Downes) [USNM]; 1 ♀, Lake City, July (B. Smith) [USNM]; GEORGIA: 1 ♀, St. Simon Isl., May (J. Bradley) [CU]; SOUTH CAROLINA: 1 ♀, McClellanville, May (H. & M. Townes) [HKT]; NORTH CAROLINA: 2 ♀♀, Wallace, June (H. Townes) [HKT]; TENNESSEE: 1 ♀, Clarkville, April [USNM]; TEXAS: 2 ♀♀ (no further data) [ANSP, USNM].

12. *Anisopyris rugosicollis* Brues

(Fig. 28)

Anisopyris rugosicollis Brues, 1908, Bull. Wis. Nat. Hist. Soc., 6:48-49. [Type: ♀, Esperanza Ranch, Brownsville, Texas (C. Schaeffer), USNM no. 42712.] —Kieffer, 1914, Das Tierreich, 41:435, 436. —Muesebeck and Walkley, 1951, U. S. Dept. Agri. Monogr. 2, p. 731.

This form possesses an abundance of specific characters and shows no close relationship to any other known species. Doubtless it will prove to occur widely in Mexico and Central America.

Female.—Length 4.0-4.5 mm.; fore wing 2.5-3 mm. Head bronzy-green, with violet reflections; pronotal disc bronzy-green; mesopleura and sides of pronotum bronzy bluish-green; mesoscutum and scutellum violet with some bronzy reflections; mouthparts and adjacent parts of under side of head rufo-castaneous; clypeus and area around antennal sockets rufo-castaneous, except apical margin of clypeus narrowly black; antennae rufous, somewhat dusky apically; anterior part of pronotum (i.e., the collar) rufous; tegulae brown; front and middle legs dark reddish-brown; tarsi yellow-brown; hind legs light reddish-brown; propodeum and gaster black. Wings hyaline, fore wings bifasciate, with a distinct brown cloud in outer part of median and submedian cells and a second cloud above and below the radial vein. Mandibles with five teeth which are somewhat irregular, the innermost tooth weak, fig. 28. Clypeal carina broad, not arched. Antennal scrobes not margined above by a carina. Front somewhat shining, very strongly alutaceous, punctures small and barely evident. Middle interocular line .62 times transfacial line, 1.15 times eye height; ocello-ocular line 1.1 times width of ocellar triangle. Vertex extending well above eye tops, rounded. Pronotal disc with the margining carinae strong, groove paralleling the posterior margin consisting of a series of rather large foveae; area set off by the margining carinae and posterior groove filled with numerous (more than 20) somewhat irregular, anastomosing longitudinal carinae. Mesonotum strongly alutaceous; groove at base of scutellum very narrow, connecting two large pits. Propodeal disc with five carinae, transversely striate between the carinae. Mesopleura strongly alutaceous, upper and lower foveae both elongate and complete. Middle tibiae not spinose.

Male.—Unknown.

Distribution.—Known only from Brownsville, Texas. I have examined three ♀ ♀ from Brownsville, all USNM.

THE SCOLYTOIDEA OF THE NORTHWEST, by W. J. Chamberlin. Oregon State College Monographs, Studies in Entomology, No. 2, 1958, 205 pp., 113 figs., \$2.50.

This is the second extensive publication on this important group of insects by Dr. Chamberlin. The former one was photolitho offset in 1939 under the title: *The bark and timber beetles of North America*. It contained 513 pages with many illustrations and an extensive bibliography. The present publication is essentially a condensation of the former work, with an elimination of those species that do not occur in the Northwest. The first 30 pages or so are full of information on such subjects as types of galleries, biologies, lists of host plants, etc. Keys to subfamilies, genera and species, and treatment of individual species make up the bulk of the publication. Many helpful illustrations are included, some original, others taken from miscellaneous sources. There are some errors or deficiencies in the paper, but it is essentially a very good treatment of the species known to occur in the Northwest.

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